

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-006999  
 (43)Date of publication of application : 12.01.1999

(51)Int. Cl. G02F 1/1333  
 G02F 1/1333  
 G02F 1/1335

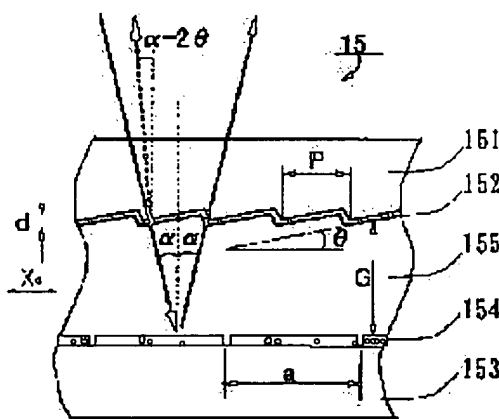
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(54) MANUFACTURE OF LIQUID CRYSTAL SUBSTRATE, LIQUID CRYSTAL DISPLAY ELEMENT AND PROJECTION TYPE LIQUID CRYSTAL DISPLAY DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To remove the unnecessary light of a projection display.

SOLUTION: The transparent electrode 152 having the saw-toothed teeth-like surface of the pitch  $P$  and height  $(d)$  is formed in a surface electrode substrate 151, the reflecting function layer 154 of the picture element length  $(a)$  is formed in the back electrode substrate 153, the liquid crystal/resin complex 155 of the average thickness  $G$  is sandwiched between both substrates ( $a > P$ ,  $a > G$ ), and the converging angle  $(\delta)$  of a projection optical system (the number of effective aperture  $F = \sin^{-1} \delta$ ) satisfies  $\theta_{AV} \geq \delta/2$  when the average value in the effective dimensional length of the angle  $\theta(x)$  between the saw-toothed surface and a flat surface is meant by  $\theta_{AV}$ .



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[Date of request for examination]  
 [Date of sending the examiner's decision of rejection]  
 [Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against  
examiner's decision of rejection]

[Date of extinction of right]

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